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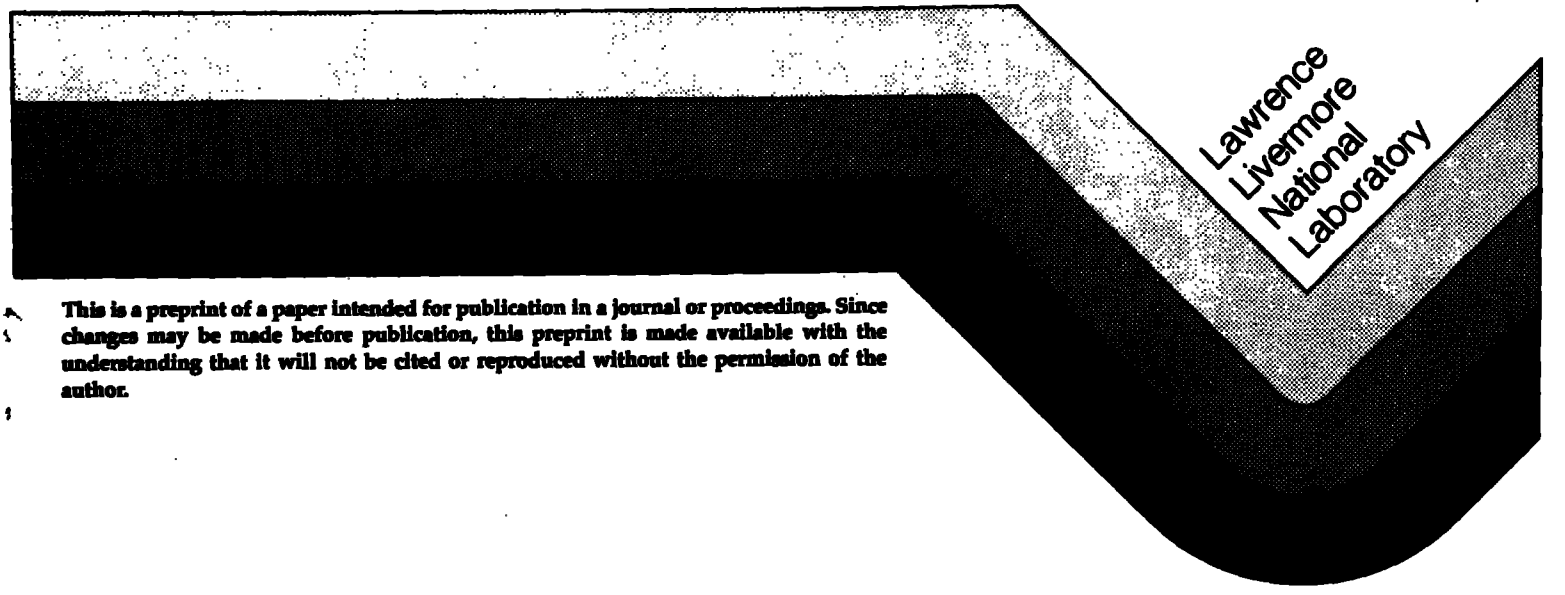

A LIFELONG ENGINEERING CAREER IS THE GOAL

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Career issues are too often reported in charts, graphs, and tables, and these statistics overlook the organic side of career development. Careers, like trees, must be tended individually and nourished over the lifetime of the employee. The employer must take an active interest in maintaining career opportunities and educational programs to guarantee secure and creative work for its staff.

Lawrence Livermore National Laboratory (LLNL) in Livermore, California, is noted as an exciting and comfortable place to work. The technical work involves state-of-the-art equipment and unique problem-solving situations. The workplace is relaxed; the dress is casual; and the schedule is flexible. A turnover rate of only 7% attests to employee satisfaction with the Laboratory.

I. THE GROWING YEARS

The Laboratory was founded in 1952 by Nobel Prize winner Ernest O. Lawrence and theoretical physicist Edward Teller at an old Navy base 45 miles east of San Francisco. Its mission was to design and test nuclear weapons to guarantee national security.

In the early days at the Laboratory, the young staff enjoyed many technical successes—prompting a rapid growth from the initial corps of 75 and a budget of $600,000. Today LLNL employs over 7500 people with a budget of $845 million a year. Its mission remains the same, but research and development work (R&D) has been extended to five fields: Defense Systems, Magnetic Fusion Energy, Lasers, Energy and Resource Programs, and Biomedical and Environmental Sciences. The University of California manages the Laboratory for the Department of Energy under a contract that is renewable every five years.

This early growth at the Laboratory, however, was stunted by the 1958 moratorium on atmospheric testing of nuclear explosives. Many professionals had to be reassigned quickly to different tasks, and LLNL began coping with technical setbacks and fluctuating federal budgets. The need to provide career opportunities and retraining programs became even more obvious when atmospheric testing was resumed three years later.

To weather this unfavorable environment, in the early sixties the Electronics and Mechanical Engineering Departments initiated extensive Continuing Education programs to replenish the skills of experienced engineers and introduce the latest technology to the entire engineering staff. These classes were the core of the Laboratory's venture into career development.

Abrupt changes in staffing needs continued; they were to become common in federally funded R&D institutions. In 1965, the nuclear propulsion program was terminated. In 1970, the layoffs that had begun in the aerospace industry reached the national laboratories, as fiscal and political forces dictated revised priorities for government spending. Livermore experienced three modest layoffs, and the climate at the Laboratory was troubled. Employees became even more aware of the need for career flexibility and management support in a turbulent budget situation.

II. THE FIRST SEEDS OF CAREER PLANNING

Responding to the uncertain environment, Laboratory management took positive steps to reduce stress on the organization and plan for its healthy operation. The goal was twofold: strengthen the Laboratory as a whole and provide more satisfying careers for its employees. A temporary placement and counseling service was established to deal with the whole individual when it became apparent that Continuing Education was not enough to ensure career vitality and flexibility.

The new service expanded the initial "technical skills only" orientation of career development. Now engineers were introduced to the concepts of motivation, self-awareness, and personal interactions.

As one guarantees a bountiful harvest by providing a tree with a variety of nutrients, so the Laboratory approached its staff holistically--promoting development of the entire individual to enhance his/her technical skills.

Career uncertainties, not only among those affected by the layoffs, surfaced through this temporary counseling service. The major concerns were in four areas:

- o Burn-out due to the pressure of changing technology,
- o Lack of interest in the job,
- o New interests in other fields,
- o Conflicts with colleagues and supervisors.

It appeared that those professionals who were most concerned about their careers were those who had not kept abreast of technology or who lacked the breadth to shift to a related field.

Laboratory management accepted these concerns as valid and began a study to address total career development. From the beginning both managers and employees were involved in determining program needs and structuring the actual courses and workshops.

III. A NURTURING CLIMATE

Today management at LLNL continues its commitment to human resources. Above all, it seeks to maintain rewarding, long-term careers: from new hire to retiree. As current career development research indicates, no amount of formalized career development structure will enhance employee careers without top management's dedication and support.

The positive climate at LLNL is based on many factors. Foremost is the diversified R&D mission, which provides challenging assignments as well as opportunities to work with state-of-the-art equipment and on problems of national concern. Diversification of the Laboratory mission gained momentum in the mid-seventies as the weapons program declined. Careful selection of new endeavors--fusion, energy, environment--by management allowed preservation of both advanced technology and experienced staff.

The matrix organization through which the major programs are supported by other disciplines also ensures a favorable climate. In this system the five programs use Laboratory engineers, chemists, computer scientists, and physicists; however, these people remain, administratively, in departments run by management in their own discipline. The matrix philosophy provides an organization that can better understand and promote the career of the individual. At the same time, the opportunities to move to new fields as program needs change broadens experience. Varied assignments allow individuals to sample different tasks; they have increased opportunities for career flexibility and creativity.

A strong, viable Human Resources Department promotes a nurturing climate. In addition to the counselors already on the staff, the Laboratory has added personnel to handle work related problems and employee development issues. Specifically, trainers help employees develop personal skills to facilitate upward and lateral mobility and offer supervisorial and managerial skills training; organization development specialists instruct classes in teamwork and assist groups in problem-solving issues; employee relations specialists resolve workplace problems.

Another feature of the positive climate at LLNL is the long-standing internal job-posting policy of the University of California, which became a fully integrated practice at Livermore in the mid-seventies. Employees may apply for positions without informing their supervisor; therefore, they can explore career options inside the Laboratory without jeopardizing their current assignment. Job posting alerts employees to lateral assignments and advancements of which they would normally be unaware in a large organization.

To gain fresh insights, supply new vigor, and provide more staff with management experience, the Laboratory has advocated appointing managers for a limited tenure. Many engineers and scientists view this approach as an opportunity to experience supervision without becoming committed to a management career path. In an organization where the rotation of managers is common, the return to technical work is becoming more accepted as part of a well-balanced career.

Finally, per policy, the supervisor at LLNL is directed to treat employees as a valuable human resource with a long-term value to the Laboratory. Supervisors, through official training programs, are asked to respond to, counsel, and support their employees' developmental needs--both technical and career.

Either in the forest or in the organization, climate is rarely stable. Although today's environment at LLNL is positive and effective, it remains a fragile entity. Of course, the climate

doesn't meet everyone's needs and, unfortunately, not every manager does his part. A favorable climate must be continually cultivated. Its maintenance cannot be the responsibility of the Human Resources Department alone. Overall, management support in emphasizing climate is more conducive to individual career growth than building a more formal structure for developing careers.

IV. CONTINUING EDUCATION PROGRAMS

Continuing Education, the original career development program at LLNL, has been expanded and includes:

- o Undergraduate and graduate degrees,
- o Non-credit technical Continuing Education,

To make Continuing Education more convenient, the Laboratory brings many programs to the Livermore site via interactive television links. Of the ten channels available, engineers can benefit from seven graduate-level channels from three Bay Area universities: Stanford, and the Berkeley and Davis campuses of the University of California. The television links provide a convenient means for engineers to gain advanced degrees or to audit courses during work hours. Also included is an MBA through San Francisco's Golden Gate University. A large number of in-house non-credit technical courses are also offered.

The University of California at Davis has also located its Department of Applied Science at the Livermore site. A small regular faculty is heavily supplemented by LLNL specialists who instruct courses leading to M.S. and Ph.D. degrees in either Applied Science or Computer Science. Many of the students perform their thesis research as part of their LLNL program work.

The number of employees participating in Continuing Education is increasing with well over one-half of the engineers and scientists participating in the program.

V. CAREER MANAGEMENT PROGRAMS

On the non-technical side, the majority of the Laboratory's Individual Development, Career Development, and Supervisor and Management courses are developed and taught internally. The creation of these courses is based on employee needs in conjunction with organizational goals.

Future plans include a training course to develop supervisory career counseling skills which is still in the design phase.

Career/Life Assessment and Planning Workshop

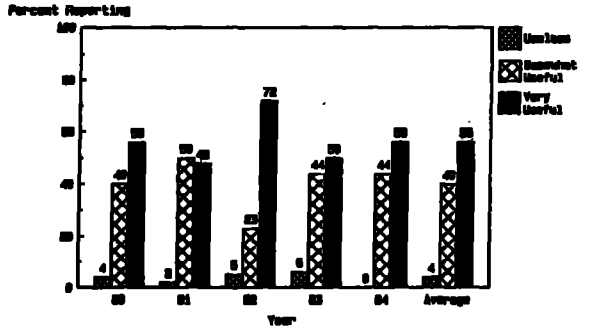
To harvest the potential of all employees, the Laboratory sponsors the Career/Life Assessment and Planning Workshop. This 32-hour course helps employees assess their values, career interests, and those skills that they like using on the job and at home. Through standardized career tests, group interaction, and individual counseling, participants examine their preferred goal-setting and decision-making styles; they also analyze how they interact with people at work and at home. All this information is then examined in terms of making career and life decisions.

The original Career/Life Assessment and Planning Workshop was started twelve years ago as an out-placement assistance program for scientific and technical people affected by the layoffs in the seventies. It worked so well that Laboratory management, in line with its commitment to career development, decided to institute the workshop as an on-going career management option. It is now available to all employees to sort out career and personal issues.

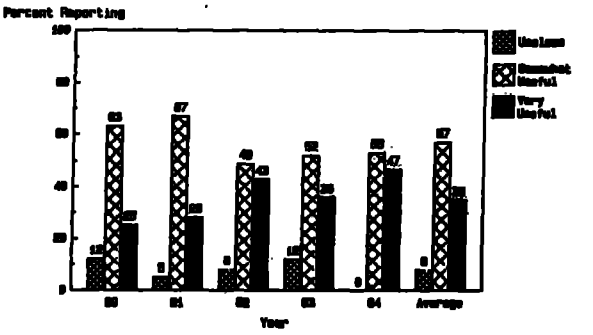
Strong management support is due in part to the positive evaluations from attendees--both immediately after the workshops and one year after attendance. These evaluations show that following the workshop participants focus their energies on their present assignment or find another position in the Laboratory where their talents will be used more effectively. Very few choose to leave LLNL to seek new careers. To date, over 1200 employees have participated with each workshop having 18 participants.

Supervisor feedback indicates that workshop participants often become more dedicated employees, more focused on their careers. The workshop encourages employees to discuss their learning and insights with their supervisors to strengthen the supervisor/employee relationship. The following graphs show the usefulness of the workshops from the viewpoint of both supervisors and participants.

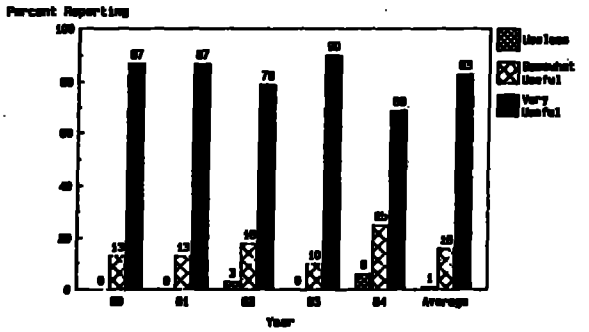
"HOW USEFUL WAS THE WORKSHOP TO THE PARTICIPATING EMPLOYEE?"
(Supervisors)



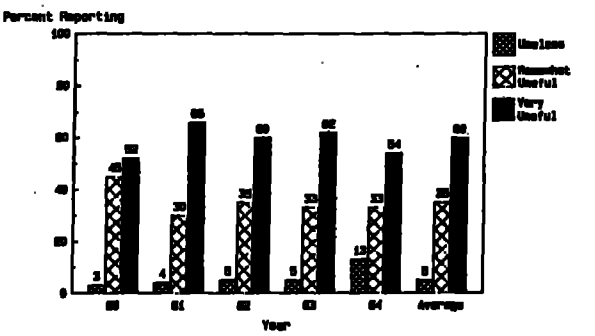
"HOW USEFUL WAS THE WORKSHOP TO THE LABORATORY?"
(Supervisors)



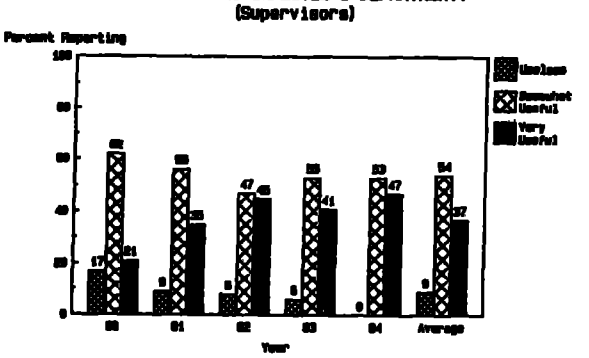
"HOW USEFUL WAS THE WORKSHOP TO THE PARTICIPATING EMPLOYEE?"
(Participants)



"HOW USEFUL WAS THE WORKSHOP TO THE LABORATORY?"
(Participants)



"HOW USEFUL WAS THE WORKSHOP TO THE PARTICIPATING EMPLOYEE'S DEPARTMENT?"
(Supervisors)



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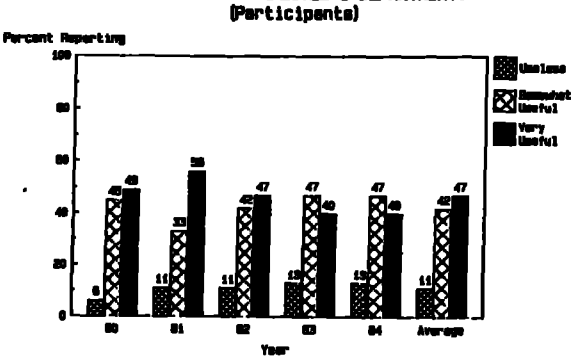
(Participants)



Building on Experience; Careers—Phase II

Just as the young tree struggles to establish its root structure, in their early careers engineers spend considerable time and energy in getting established--learning to balance their professional and personal lives and, at the same time, make a valuable contribution to the organization. Yet, according to life stages research, expecting the education and experience attained at the beginning of a career to keep one on the cutting edge is possibly unrealistic and unsatisfying. This realization is part of what has been termed "the mid-life crisis."

The Laboratory has recognized the importance of a mid-life evaluation. As a result, LLNL offers two new courses: one for managers of older employees and one for the older employees themselves. The manager's program is entitled Building on Experience; the employee's program is called Careers--Phase II.

Like the nation, the Laboratory is greying. About one-third of the Laboratory employees are over 50 years old with their average service experience being over 18 years. (Many employees choose to spend their entire careers at the Laboratory.) Since there is an inverse relationship

between years of service and mobility rates, it is safe to assume these employees will be with the Laboratory until retirement. Therefore, the manager will want to know the needs and talents of this older population. Many have developed unique skills based on years of experience that cannot be replaced by the "new seedling" just out of school.

To assure that these experienced employees operate in an environment that will continue to optimize their skills, the Building on Experience workshop leads managers to assess the environment they create for their older workers. Managers learn the myths and realities of aging, the differences in attitudes and values of older and younger workers, and how this older generation impacts the work environment. Above all, they learn how to facilitate communication between the generations.

Through case studies and group discussion, the managers practice an age-neutral approach. This is beneficial to the organization in preventing stereotypes from limiting the optimum contribution of each employee. The most common reaction of managers to the stereotypes is amazement that these ideas are stereotypes. Managers end up with a more positive view of their own aging and, therefore, of the older employees who report to them. Given the correct care, the senior employee, like the mature tree, contributes abundantly.

The employee gains from his/her manager's participation in the workshop because the manager is now better able to evaluate the individual on his/her merits. An honest merit evaluation stimulates employees of all ages.

Approximately 200 managers and supervisors of scientific, engineering, technical, clerical and administrative employees have attended the Building on Experience workshops. The following reflects long-term action suggestions generated through these sessions with the corresponding frequency percentage:

- Training 29%
  Using older workers as trainers as well as making sure they are offered the necessary training to keep their technology updated.

- Attention from the supervisor/organization 26%
  More supervisor interaction by giving feedback, providing greater recognition, defining goals and rewards.

- Work environment 17%
  Look at compatability, age and skill mix ratio and how assignments are divided.

- Mentor relationships 13%
  To transfer knowledge and technology as well as a rewarding role for older workers.

- Compensation 8%
  Rewards other than pay that motivate older workers.

- Assignment 8%
  Make sure the older workers get assignments that give fresh ideas and challenges.

At the same time it is important to have individual employees review their own beliefs about aging in Careers—Phase II. This workshop includes the myths and realities about aging; patterns of living and dying; differences in attitudes and values of older and younger workers; goals and possibilities for the last 15 to 20 career years; barriers or commitments to change; the myth of "maturity" and other mid-life issues; financial planning; and an action plan for a healthy career in the remaining work years.

Seldom do individuals go about such an organized reassessment on their own. Yet, these are the issues that will consume the employee's energy on a conscious or unconscious level. Mid-life is a time for many transitions. Research shows that recognizing these transitions and consciously spending time dealing with their stages helps speed resolution of any role loss or shift. By devoting several intensive days with fellow employees discussing the same transitional issues in a supportive atmosphere, this process can be accelerated. The use of support services—counseling, sick leave, employee relations issues—may be reduced.

Employees are excited to learn how many of their beliefs about their own aging are myths. Some are even angry that if these are myths rather than facts, they will now have to accept responsibility for their own careers and no longer use the excuse of age. Support networks grow at the workshop, as employees begin to share their experiences and values.

Only two Careers-Phase II workshops have been conducted so far with approximately 35 employees in attendance. The evaluations from these participants are very favorable with the most valuable parts of the workshops identified as:

- o Awareness of barriers around aging
- o Assessing values and needs
- o Developing plans/goals based on new understanding.

Sometimes younger employees leave an organization because they think older workers are poorly treated. Additionally, younger employees tend to avoid areas that are full of angry, bitter old-timers. By having managers and employees face the realities and myths of aging in an organized manner, the young engineer can see the Laboratory as the best site for a lifelong career.

Revitalization Program

The very mature tree, as it loses its vitality, ceases to produce. Some employees who were once creative and productive, become dead wood for the organization. They may tend to keep a low profile and avoid subjecting their ideas and work to critical review. These employees sometimes blame their poor performance on others and may stifle the creativity of other workers by their attitudes.

Concern for this type of employee and the resultant loss to the organization became an issue at the Laboratory in the early eighties. As a result, the Employee Development Division inaugurated the Revitalization Program to help these employees salvage their careers and restore their sense of well-being.

This new program differs from other workshops because of its size and content. Each workshop contains only five to eight people, and the employee's immediate supervisor must be willing to work on the problem on a continuing basis with the employee. In fact, the supervisor, with the program facilitator and individual employee, work as a team in the revitalization process. The employee group meets once a week for several months, and the supervisor group meets on a monthly basis with additional sessions held periodically to enhance communication between supervisors and participants. Through group discussion of their problem situations, participants explore their own role in their devitalization. This is a serious, intense workshop where it is clear that something useful must result. Achievement motivation patterns are identified to provide participants with an understanding of the pattern of skills, environment, and interpersonal styles they use when they are most satisfied and productive. A career plan is developed and implemented by each participant.

Laboratory management has been supportive of the Revitalization Program because the participants were formerly key contributors, and the potential of recovering this former talent plus their productivity is significant. While the program was temporarily stalled due to the untimely death of Jack Brewer, the early results (verbal evaluations from both participants and supervisors as well as performance appraisals and salary reviews) show that definite improvement was reported in nine of the participants; five retired or resigned to do other things that they realized were more meaningful for them; one has not shown any improvement; and one is just beginning to show improvement through a series of supervisory and job assignment changes.

Future plans include a revitalization program for senior level administrative/clerical staff called "Taking Charge" which is presently going through the pilot phase of development.

VI. SUMMARY

In summary, we feel LLNL actively seeks to provide a nurturing climate to support lifelong engineering careers. Through the Human Resources Department, the Laboratory has created a career development program by which individuals, at points along their growth path, can stop, review and evaluate their lives and careers.

The Career Management Programs are offered to stimulate continued growth along this path. First, the Career/Life Assessment and Planning Workshop is available for those seeking answers about themselves and their careers through self-assessment and skills analysis. Second, the Building on Experience workshop for managers and the Careers—Phase II workshop for employees deal with the myths and realities of aging both from the standpoint of managing older workers as well as learning about the older workers themselves. In these two workshops participants develop action plans to facilitate these processes along the growth/career path during mid-life. Finally, for those who may get stalled along the way, the Revitalization Program is available to recharge growth energies in the final stages of a career.

Additionally, Continuing Education programs are available at any point along the growth path. Many employees, including those who become energized through the Career Management workshops, update their technical skills and/or develop their skills in diversified non-technical areas through these programs.

In conclusion, it is the Laboratory's belief that not only is it humanitarian to develop and nurture its staff, it is good, sound business. Factors such as the cost of replacing employees plus the cost of low morale and decreased employee productivity make lifelong engineering careers a worthwhile investment.

ACKNOWLEDGMENT

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